

CLAIMS

1. A network routing system in a network having a first routing apparatus to which one or more first communication devices are connected, and a second routing apparatus to which one or more second communication devices are connected, wherein said network routing system reserves a network resource using a service quality set-up protocol between said first routing apparatus and said second routing apparatus.

2. The network routing system according to claim 1, wherein said first routing apparatus comprises:

first service quality set-up processing unit for reserving a network resource using a service quality set-up protocol;

first packet classification processing unit for classifying a specific packet that is to be transmitted using the reserved network resource from among the data packets transmitted from said first communication device;

bit sequence setting unit for setting a predetermined bit sequence for said specific packet classified by said packet classification processing unit; and

first transfer processing unit for transferring said specific packet having the bit sequence set by said bit sequence setting unit to said second routing apparatus, using said network resource corresponding to the content of the bit sequence contained in the specific packet.

3. The network routing system according to claim 2, wherein said second routing apparatus comprises:

second service quality set-up processing unit for reserving a network resource using a service quality set-up protocol;

second packet classification processing unit for classifying the specific packet having appended the bit sequence indicating transmission using said reserved network resource from among the input data packets;

bit sequence deleting unit for deleting the bit sequence contained in the specific packet classified by said packet classification processing unit; and

second transfer processing unit for transferring the datapacket having the bit sequence deleted by said bit sequence deleting unit to said second communication device.

4. The network routing system according to claim 1, further comprising a third routing apparatus placed between said first and second routing apparatuses for routing the transmission of data packets, wherein said third routing apparatus comprises:

third service quality set-up processing unit for reserving a network resource using a service quality set-up protocol;

third packet classification processing unit for classifying the specific packet having appended the bit sequence indicating the transmission using said reserved network resource from among the input data packets; and

third transfer processing unit for transferring the specific packet classified by said third packet classification processing unit to said second routing apparatus, using said network resource corresponding to the content of the bit sequence contained in the specific packet.

5. The network routing system according to claim 1, wherein said service quality set-up protocol is a resource reservation protocol.

6. The network routing system according to claim 2, wherein said first service quality set-up processing unit transmits a service quality set-up protocol message having the bit sequence contained in an unused reserve area to said second routing apparatus to associate the traffic condition of said network resource reserved using the service quality set-up protocol with the bit sequence.

7. The network routing system according to claim 2, wherein said first service quality set-up processing unit transmits a service quality set-up protocol message having appended the bit sequence to said second routing apparatus to associate the traffic condition of said network resource reserved using the service quality set-up protocol with the bit sequence.
8. The network routing system according to claim 3, wherein said second service quality set-up processing unit checks to see whether or not the bit sequence is contained at a predetermined location of the service quality set-up protocol message transmitted from said first routing apparatus, and performs the operation in accordance with a normal service quality set-up protocol using said second routing apparatus, if the bit sequence is not contained.
9. The network routing system according to claim 4, wherein said third service quality set-up processing unit checks to see whether or not the bit sequence is contained at a predetermined location of the service quality set-up protocol message transmitted from said first routing apparatus, and performs the operation in accordance with a normal service quality set-up protocol using said third routing apparatus, if the bit sequence is not contained.
10. The network routing system according to claim 2, wherein when the specific packet is an IP packet in accordance with the Internet protocol version 4, the bit sequence is contained in the type of service field that is found in the header part of the IP packet.
11. The network routing system according to claim 2, wherein when the specific packet is an IP packet in accordance with the Internet protocol version 6, the bit sequence is contained in the traffic class field that is found in the header part of the IP packet.

12. The network routing system according to claim 2, wherein when the specific packet is an IP packet, the bit sequence is appended in the header part of the IP packet.

13. The network routing system according to claim 2, wherein said bit sequence setting unit sets a random value as the bit sequence.

14. The network routing system according to claim 2, wherein said bit sequence setting unit sets the value of the bit sequence in ascending order or descending order.

15. The network routing system according to claim 2, wherein said bit sequence setting unit sets the preset value of the bit sequence in correspondence to the IP address of said second routing apparatus.

16. The network routing system according to claim 2, wherein said bit sequence setting unit sets the preset value of the bit sequence in correspondence to the communication band of said network resource reserved by said first service quality set-up processing unit.

17. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the destination address of the data packet transmitted from said first communication device.

18. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the destination network address of the data packet transmitted from said first communication device.

19. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the transmission source address of the data packet transmitted from said first communication device.

20. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the transmission source network address of the data packet transmitted from said first communication device.

21. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the destination port number of the data packet transmitted from said first communication device.

22. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on the protocol number of the data packet transmitted from said first communication device.

23. The network routing system according to claim 2, wherein said first packet classification processing unit classifies the specific packets, based on a reception interface of the data packet transmitted from said first communication device.

24. The network routing system according to claim 2, wherein said first routing apparatus has a conditional database containing information of combining the addresses of a plurality of second routing apparatuses and the destination addresses of the specific packets, in the case where there are the plurality of second routing apparatuses that are transmission destination of the specific packets, said first service quality set-up processing unit retrieves said conditional database, based on an address of the specific packet transmitted from said first communication device to designate said second routing apparatus that exists in front of the network connecting the communication devices that is the destination of the specific packet, and transmits a service assurance set-up protocol message to said second routing apparatus designated.

25. The network routing system according to claim 2, wherein said first routing apparatus has a conditional database containing information of combining the addresses of a plurality of second routing apparatuses and the destination network addresses of the network connected to said second routing apparatus, in the case where there are the plurality of second routing apparatuses that are transmission destination of the specific packets, said first service quality set-up processing unit retrieves said conditional database, based on the destination network address of the specific packet transmitted from said first communication device to designate said second routing apparatus that exists in front of the network connecting the communication devices that is the destination of the specific packet, and transmits a service assurance set-up protocol message to said second routing apparatus designated.

26. The network routing system according to claim 2, wherein said first routing apparatus has a conditional database containing information of combining the addresses of a plurality of second routing apparatuses and the destination port numbers of the specific packets, in the case where there are the plurality of second routing apparatuses that are transmission destination of the specific packets, said first service quality set-up processing unit retrieves said conditional database, based on the destination port number of the specific packet transmitted from said first communication device to designate said second routing apparatus that exists in front of the network connecting the communication devices that is the destination of the specific packet, and transmits a service assurance set-up protocol message to said second routing apparatus designated.

27. The network routing system according to claim 2, wherein said first routing apparatus has monitoring unit for monitoring the data rate of the specific packet, and said

first service quality set-up processing unit changes the content of reserving said network resource, when a variation in data rate is detected by the monitoring operation of said monitoring unit.

28. The network routing system according to claim 2, wherein said first service quality set-up processing unit starts the reserving operation for the network resource, when the specific packet is first detected.

29. The network routing system according to claim 2, wherein said first routing apparatus has a timer for clocking a predetermined time, and said first service quality set-up processing unit initiates said timer when the last specific packet is detected, and tears down the reservation of said network resource when a predetermined time has elapsed before the next specific packet is detected.

30. The network routing system according to claim 2, wherein said first routing apparatus has a schedule timer for clocking a predetermined length of time, and said first service quality set-up processing unit reserves the network resource within the predetermined time.

31. The network routing system according to claim 3, wherein said second service quality set-up processing unit transmits a second service quality set-up protocol message to said first routing apparatus to reserve the network resource corresponding to the transmission path set from said second routing apparatus to said first routing apparatus, upon receiving a first service quality set-up protocol message for starting the reserving operation of the network resource from said first routing apparatus.

32. The network routing system according to claim 31, wherein said second service quality set-up processing unit transmits a second service quality set-up protocol message to said first routing apparatus in the case where the transmission source address of the first service quality set-up protocol message

that has been received corresponds to said first routing apparatus.

33. The network routing system according to claim 31, wherein said second service quality set-up processing unit transmits a second service quality set-up protocol message to said first routing apparatus in the case where the first service quality set-up protocol message that has been received includes the same data as the bit sequence contained in the specific packet.

34. A routing apparatus comprises:

service quality set-up processing unit for reserving the network resource using a service quality set-up protocol;

packet classification processing unit for classifying the specific packet that is to be transmitted using the reserved network resource from among the data packets transmitted from one or more communication devices;

bit sequence setting unit for setting a particular bit sequence to the specific packet classified by said packet classification processing unit; and

transfer processing unit for transferring the specific packet having the bit sequence set by said bit sequence setting unit using the network resource corresponding to the content of the bit sequence contained in the specific packet.

35. The routing apparatus according to claim 34, further comprising bit sequence deleting unit for deleting the bit sequence contained in the received specific packet when the specific packet containing the bit sequence is received, wherein said transfer processing unit transmits the specific packet having the bit sequence deleted to said communication device.

36. The routing apparatus according to claim 34, wherein said service quality set-up protocol is a resource reservation protocol.

37. The routing apparatus according to claim 34, wherein said service quality set-up processing unit generates a

service quality set-up protocol message having the bit sequence contained in an unused reserve area to associate the traffic condition of said network resource reserved using the service quality set-up protocol with the bit sequence.

38. The routing apparatus according to claim 34, wherein said service quality set-up processing unit generates a service quality set-up protocol message having appended the bit sequence to associate the traffic condition of said network resource reserved using the service quality set-up protocol with the bit sequence.

39. The routing apparatus according to claim 34, wherein said service quality set-up processing unit checks to see whether or not the bit sequence is contained at a predetermined location of the service quality set-up protocol message transmitted from the other device, and performs the operation in accordance with a normal service quality set-up protocol if the bit sequence is not contained.

40. The routing apparatus according to claim 34, wherein when the specific packet is an IP packet in accordance with the Internet protocol version 4, the bit sequence is contained in the type of service field that is found in the header part of the IP packet.

41. The routing apparatus according to claim 34, wherein when the specific packet is an IP packet in accordance with the Internet protocol version 6, the bit sequence is contained in the traffic class field that is found in the header part of the IP packet.

42. The routing apparatus according to claim 34, wherein when the specific packet is an IP packet, the bit sequence is appended in the header part of the IP packet.

43. The routing apparatus according to claim 34, wherein said service quality set-up processing unit starts the reserving operation for the network resource, when the specific packet is first detected.

44. The routing apparatus according to claim 34, further comprising a timer for clocking a predetermined time, wherein said service quality set-up processing unit initiates said timer when the last specific packet is detected, and tears down the reservation of said network resource when a predetermined time has elapsed before the next specific packet is detected.

45. The routing apparatus according to claim 34, further comprising a schedule timer for clocking a predetermined length of time, wherein said service quality set-up processing unit reserves the network resource within the predetermined time.